

WHAT IS CLAIMED IS:

1. A radio communication system comprising:
- (a) at least one mobile station;
- (b) a plurality of base stations configured to generate a
- 5 plurality of beam patterns; and

(c) a base station controller which is connected to the plurality of base stations, and then assigns a fixed channel to each mobile station, controls the beam patterns of the base stations and accordingly carries out a radio communication with the mobile station, the base

10 station controller having a device which when carrying out a transmission and a reception to and from a different mobile station to which the same channel is assigned, controls the beam patterns so that the channels do not interfere with each other.

- 15 2. A radio communication system of claim 1,
- wherein the mobile station is a mobile station running on a road, and at least a part of the plurality of base stations are arranged along the road.

- 20 3. A radio base station controller which is connected to a plurality of base stations configured to generate a plurality of beam patterns, and then controls an antenna that is installed in each of the base stations and composed of a plurality of antenna devices, and accordingly carries out a radio communication with a mobile station, the
- 25 radio base station controller comprising:

- (a) an antenna controller configured to control the antenna in each of the base stations; and
- (b) at least one modulating/demodulating device configured to modulate and demodulate a signal which is transmitted to and
- 30 received from the mobile station.

4. A radio base station controller of claim 3, wherein the antenna controller comprises:
- a selector configured to select at least one antenna device from
- 35 the plurality of base stations; and

a setter configured to set a weight of the selected antenna device.

5. A radio base station controller of claim 4, wherein the setter has a device configured to determine the weight of the antenna device so that when a transmission or a reception is carried out to or from a different mobile station to which the same channel is assigned.

6. A radio base station controller of claim 4, wherein the antenna controller further has a measuring device configured to measure respective reception strengths of the respective antenna devices in the plurality of base stations.

7. A radio base station controller of claim 3, wherein the mobile station is a mobile station running on a road, and at least a part of the plurality of base stations are arranged along the road.

8. A radio base station controller which is connected to a plurality of base stations arranged along a road, and then controls the plurality of base stations, and accordingly carries out a radio communication with at least one mobile station running on the road, the radio station controller comprising:

- (a) a device configured to assign the same channel to each mobile station of the same speed or the same lane;
- (b) a device configured to detect at least one of the speed and the lane of the mobile station; and
- (c) a device which when the speed or the lane of the mobile station is changed, changes an assignment channel, in accordance with a speed or a lane after the change.

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9. A radio base station controller of claim 8, wherein a communication interval is changed depending on the change of the speed of the mobile station.

10. A radio mobile station which is connected to a plurality of

base stations configured to generate a plurality of beam patterns, and then carries out a radio communication with a base station controller that can control an antenna installed in each of the base stations and composed of a plurality of antenna devices,

5            wherein the radio mobile station transmits a signal including at least information to identify the radio mobile station, even if there is not a signal to be transmitted to the base station controller.

11.        A radio base station controller which is connected to a plurality of base stations arranged along a road, and then controls the plurality of base stations and accordingly carries out a radio communication with at least one mobile station running on the road,

          wherein a boundary between radio base station controllers adjacent to each other is positioned in a portion in which a movement destination of the mobile station on the road can be pointed out.

12.        A radio communication system comprising:

(a)        at least one mobile station having a device configured to select, from a plurality of same reception signals, a reception signal in which a reception state is better;

(b)        a first base station controller having a device configured to detect a start of a communication between a predetermined first base station and a mobile station, a device configured to request a hand-over process to the mobile station, and a device configured to transfer a transmission signal to the mobile station to a base station controller of a hand-over destination of the mobile station, the first base station controller connected to a first base station group including the predetermined first base station; and

(c)        a second base station controller having a device configured to transmit the transmission signal transferred from the first base station controller, through a predetermined second base station to the mobile station, the second base station controller connected to a second base station group including the predetermined second base station.

13. A radio communication system of claim 12, wherein the predetermined first and second base stations are arranged close to a boundary between the first and second base station controllers.

5 14. A radio communication system of claim 12, wherein the mobile station is a mobile station running on a road, and

at least a part of the first and second base station groups including the predetermined first and second base stations is positioned in a portion in which a movement destination of the mobile station on the  
10 road can be pointed out.

15 15. A radio communication system of claim 14, wherein the first base station controller further comprises:

a device configured to detect a speed of the mobile station; and

15 a device configured to change the predetermined first base station, in accordance with the detected speed.

20 16. A radio communication system of claim 14, wherein the first and second base station groups arranged along the road are arranged in a predetermined interval, and an interval between a first base station and a second base station which are the closest to each other is shorter than the predetermined interval.

25 17. A radio communication system of claim 14, wherein the first and second base station controllers select an optimal transmission rate and error correction code in accordance with a speed of the mobile station when performing a hand-over process on the mobile station, and then carry out a transmission and a reception to and from the mobile station.

30 18. A radio communication method comprising the steps of:

(a) detecting a start of a communication between a predetermined first base station connected to a first base station controller and a mobile station running on a road;

35 (b) requesting a hand-over process to the mobile station;

(c) transferring to a second base station controller, a signal to be transferred through the predetermined first base station to the mobile station;

(d) transmitting the signal to the mobile station through a predetermined second base station connected to the second base station controller; and

(e) selecting a signal in which a reception state is better, from two signals received by the mobile station.

10           19. A radio communication method of claim 18, wherein the predetermined first and second base stations are arranged close to a boundary between the first and second base station controllers.

20           20. A radio communication method of claim 19,  
15           wherein the first base station controller is connected to a first base station group including the predetermined first base station,  
              the second base station controller is connected to a second base station group including the predetermined second base station, and  
              at least a part of the first and second base station groups  
20           including the predetermined first and second base stations is arranged along a portion in which a movement destination of the mobile station on the road can be pointed out.